Asian Pac. J. Health Sci., 2015; 2(2): 128-136 e-ISSN: 2349-0659, p-ISSN: 2350-0964

A clinical study of complications of intraocular lens implantation

Koppolu Sreedhar Reddy [1*], Venkata Prasanna D.P [2]

[1]Associate Professor Narayana Medical College, Nellore, A.P., India*
[2]Consultant Ophthalmologist,Department of Ophthalmology, Narayana Medical College, Nellore, A.P,Shankar Eye Hospital, Guntur, A.P., India

ABSTRACT

Objective: Main objective is to study of complications encountered with cataract extraction with IOL implantation . **Methodology:** This study was on 1500 patients selected in random aged more than 40 years who underwent extracapsular cataract extraction with posterior chamber intraocular lens implantation and followed up for a period of 6 months. **Results:** Incidence of Cataract was more in the age group of 40-60 years and males were predominant (64%). Senile mature cataract was the main indication for surgery. Common complication intraoperatively is posterior capsular rupture of 4.13%, most common intermediate post operative complication is straite keratitis of 51.33% and late post operative complication after cataract pseudoplakic bullous of 13.66% is observed. . Visual acuity in patients was poor with counting fingers in 76% before surgery, After follow up of 6 months patients visual acuity of 6/6 is seen in 33.6 % of operated cases. **Conclusion:** Complications of PC IOL implantation can be minimized by better microsurgical techniques, magnification and the experience of operating surgeon.

Keywords: Extracapsular cataract extraction, Posterior chamber intraocular lens, Complications.

Introduction

Cataract is defined anatomically as any opacity on or inside the lens clinically. As the opacities in lens obstructing vision, and biochemically, as any opacity with irreversible coagulated proteins. The earliest authentic records of surgical relief of cataract come from ancient Hindu Medicine, long before Christian era. The greatest exponent of this school was sushrutha. In this, cataract was recognized as opacity in the eye-apple[1].One of the greatest challenges facing world ophthalmology today remains the unacceptably high prevalence operable cataract blindness in the developing world. 28% of Population over 40 years and 65.70% above 60 years has operable cataracts. The only treatment for cataract causing visual handicap is its removal by surgery. The establishment of national and international cataract programs, frequently funded and supported by international agencies, has achieved a steady increase in the number of cataract operations performed. But current level remains too low to tackle the backlog of cataract blind. The present annual level performance is 3 million to have a significant impact on the huge backlog of over 14 million/annum.[2] The choice of surgery depends on various factors and the technique selected should be acceptable, accessible, affordable and scientifically sound. The standard intra capsular cataract extraction (ICCE) was in practice for many years, but with changing technology, micro surgical precision, refinement of aspiration technique, need for artificial lens implantation and with better. Training of the surgeons, we have come to modern day extra capsular cataract Extraction (ECCE). The introduction of IOL implantation, especially posterior chamber lenses, has necessitated extra capsular cataract extraction.[3]Intra ocular lens is the best choice for optical correction of aphakia, since it is comfortable, freedom from patient handling with minimal anisokonia, rapid return of binocularity, normal peripheral vision and good patient compliance. IOL offers an almost normal optical situation. The problems of retinal image size are largely eliminated. There is no peripheral distortion of images and many patients have some degree of useful near vision along with good unaided distant vision even without any particular spectacle reading supplement – a condition referred to as pseudo accommodation. Hence due to limitation of

**Correspondence*
Koppolu Sreedhar Reddy
Associate Professor Narayana Medical College, Nellore, A.P., India

the various methods of correcting aphakia, in present times date, IOL implantation is considered to be the best way of correcting aphakia, unless otherwise contraindicated. Recently silicone foldable lenses are becoming popular, made of medical grade silicone[5,6]. This lens can be folded and placed inside through 3mm incision, Once the lens is in the P.C. it is unfolded and positioned. Main advantages are less post operative astigmatism and rehabilitation time. Other type of flexible lens is made of polysulfone. Polysulfone is transparent. It has high degree of heat resistance. It can be autoclaved Polysulfone comes as a pellet. It can be made into sheets which can be lathecut and latheground. It is totally insert, refractive index being 1.633[6,7]. Phacoemulsification, sutureless self sealing tunnel incision, and foldable intraocular lens (IOL) have changed the cataract surgery dramatically over the past two decades. Post operative astigmatism and inflammation are typically minimal; visual recovery and patients rehabilitation are accelerated. The published literatures indicate that modern cataract surgery, through, certainly not free of complications, provides a remarkably safe procedure, regardless of which extraction technique is used[8,9,10.]IOL implant surgery is the most common ocular surgery and comprises 90% of all Ophthalmic surgeries performed by most ophthalmic surgeons in developed as well as developing countries. Since, complications are inherent to every surgery and to every surgeon, so it is with IOL implantation surgery also, be it AC lens or PC lens. When complications are studied it becomes obvious that the majority of the problems are iatrogenic and therefore preventable. Hence, the key elements include prevention, recognition and management of the major intra and postoperative complications of cataract surgery. Most of the complications of IOL implantation surgery if managed effectively will not or minimally affect the final outcome of the surgery. The recognition and proper management of operative complications are equally important, for if not adequately managed, may lead to a sequence of further complications. Delay in the treatment may adversely affect the visual prognosis. Several modalities and advances are available in the management of complications. Cataract Surgery is the most unpredictable of all ophthalmic surgeries in its outcome on account of variety of complications that may occur during surgery and in the pre and postoperative period. The operative complications of cataract surgery are many, some of which lead to serious consequences. They include retro bulbar hemorrhage, rupture of lens capsule, and operative loss of vitreous and expulsive hemorrhage. The most important complications of cataract surgery is aphakia itself. The main post operative complications are corneal oedema, shallow anterior chamber, uveitis, papillary block, aphakic glaucoma, iris prolapsed, endophthalmitis, cystoids macular oedema, vitreous changes, after cataract, retinal detachment, epithelial down growth, fibrous in growth and post operative corneal astigmatism.[11,12]Complication following IOL implantation can occur in any surgeon's hand, but if they are not recognized and treated effectively, they can be vision threatening and also results in varying degrees of ocular morbidity, since IOL implantation is a single tune procedure and any mistake done, the patient has to live with it or is subjected to secondary procedure which carries double the risk. Hence our main objective is to study complications encountered with cataract extraction with IOL implantation, the incidence of various complications and to see how best they can be minimized using modern microsurgical techniques and how successfully these complications can be treated.

Materials and method

This study was based on 1500 patients selected in random who were above the age of 40 years who underwent extracapsular cataract extraction with posterior chamber intraocular lens implantation in our Hospital, for 2 years from March 2010 to February 2012. Patients were followed up for a period of 6 months. Patients were admitted one day before surgery. Prior top admission all patients underwent general systemic and ophthalmological examinations. A proper history was taken regarding general condition and refractive status. Investigations included haemogram and urine for sugar, albumin and microscopic study. In old patients an ECG and Chest x-ray were taken. The ophthalmological examination included external examination, slit lamp examination, visual function assessment using macular function tests, measure of intraocular pressure using schiotz tonometer, patency of lacrimal passages and conjunctival swab for culture and fundoscopic examination. The K1 and K2 readings of the eye to be operated were taken using cannon auto refractometer the readings recorded in millimeter. The axial length was measured with sonomed – A scan unit. The IOL power was calculated by using SRK II formula which is incorporated into the sonomed A scan unit. Patients selected belonged to all age groups. Cases selected for IOL implantation were presenile cataracts, senile cataracts, hypermature cataracts and nuclear cataracts. The surgeries were performed by using either Zeiss Microscope or Wild Heerbrug Microscope. A written consent was taken from the patient and the eye lashes were trimmed. These patients

were put on oral chloromycetin capsule 250mg q.i.d. and Tab Diamax 250mng one tablet previous night and one on the day of surgery. Patients undergoing surgery under local anesthesia were advised to take light food early. The pupil was dilated with tropicmide 1% and phenylephrine 109% from 6 amn on the day of surgery at an interval of one drop each every 10mninutes for 5 times. The patients eye and surrounding areas were cleaned with iodine first and then with spirit in the theatre. Patient was given peribulbar anaesthesia with 2% infiltration lignocaine hydrochloride along with adrenaline diluted in 1.20,000 and 1,500 units of Hyaluronidase were mixed in the vial of lignocaine. The skin of the eye lids and surrounding area was prepared with iodine and spirit and draped with sterile towels. Lid stitches or universal speculum were used to separate the lids. The eye was held in position by putting a brittle suture around superior rectus muscle. A fornix based conjunctival flap was reflected and a stab incision was made at the limbus to enter anterior chamber. Anterior chamber was filled with oculose. Anterior capsulotomy was done by can opener technique using irrigating cystitome (26 Gz). The corneal section was then extended with the corneoscleral extension scissors to 120 to 160 degrees depending upon the size of the nucleus. The nucleus was expressed with the lens expressor and vectis. Cortical wash was done with normal saline or balanced salt solution using simcoes bulb and cannula. A peripheral button hole iridectomy was done in most cases. In all the cases "in the bag" or sulcus fixated posterior chamber lenses were implanted. When there was a posterior capsular tear, A.C. lenses were implanted. The corneal section was closed with sutures after the anterior chamber was reformed with air and saline or ringer lactate. A Subconjunctival injection of Gentamycin (20mg) Dexamethosone (2mg) was given and chlaromycetin eye ointment was instilled into the conjuctival sac. The operated eye was given a pad and bandage. The dressing was opened the next day. Findings were carefully noted regarding apposition of corneoscleral wound. The corneal clarity, the formation of anterior chamber, presence of cortical matter, position of the pseudophakos, papillary distortion, iris pigment dispersion etc., The examination findings were confirmed by slit lamp examination. Vision was recorded daily. A drop of antibiotic and steroid was instilled and ointment applied into the conjunctival sac and dressing was done with aseptic precautions. Systemic antibiotics continued for 5 days. In some cases oral predinisolone was given and tapered gradually. In case of iritis subconjunjctival injection of 0.5cc steroid was given. Patients were kept in the hospital for 3 days. On the day of discharge slit lamp examination was done and visual acuity recorded. Fundus was examined, patients were asked to continue steroid eye drops 6 times/day and ointment once daily. Patients were reviewed at 1 week, 3 week, 6 weeks and 6 months. During each visit the above mentioned routine examinations were done with special reference to complications and noted to analyze for the purpose of this study.

Results

Present Study results for a period of two years in 1500 operated cases are analyzed on Microsoft excel and percentages are calculated.

Table 1: Age distribution in the study

Age intervals(in years)	Number	Percentage(%)
41-50	63	4.2
51-60	798	53.2
61-70	474	31.6
71-80	98	6.5
81-90	67	4.5
Total	1500	100

Higher incidence of cataract is seen in 50-70 years of age group in our study

Table 2: Gender distribution in the study

Gender	Number	Percentage (%)
Males	960	64
Females	540	46

Males are high in percentage with cataract in our study.

Table 3: Type of cataract

Type of cataract	Number	Percentage (%)
Pre senile cataract	75	5
Senile cataract	1050	70
Hyper mature	25	1.6
Nuclear cataract	350	23.4

Incidence of senile cataract is more in present study.

Table 4: Pre operative visual acuity

Visual acuity	Number	Percentage (%)
Perception of light	75	5
Hand moments close to face	275	18.3
Counting fingers from 1-2 meters	1150	76.7

Patients with cataract having impaired vision with visual acuity of counting fingers from 1-2 mts are high 76.7% of total study.

Table 5: Intra operative and Post operative in the present study

COMPLICATION	NUMBER	PERCENTAGE (%)
Intra operative complications		
Hypheama	17	1.13
Posterior capsular rupture	62	4.13
Vitreous loss	30	2
Iridodialysis	12	0.8
Intermediate post operative complications		
Straite keratitis	770	51.33
A.C. depth abnormality	18	1
Hyphaema	17	1.13
Uveitis	375	25
Remnants of lens matter	480	25
Papillary distortion	330	22
TOL dislocation	9	0.6
Pseudo phakic papillary block	0	0
Secondary glucoma	8	0.53
Endophtalmitis	4	0.26
Late Post Operative complications(6 month-1 year)		
After cataract	2.5	13.66
Pseudoplakic bullous		
Keratopathy	4	0.26
Retinal detachment	6	0.4
UGH syndrome	9	0.6
Macular odema	6	0.4
Pupillary distortion	379	25.26

Common complication intraoperatively is posterior capsular rupture of 4.13%, most common intermediate post operative complication is straite keratitis of 51.33% and late post operative complication after cataract pseudiplakic bullous of 13.66% is observed.

Table 6: Early and Late complications of posterior chamber intraocular lens

COMPLICATION	NUMBER	PERCENTAGE (%)
Early complications of PC IOL		
Pupil capture	37	2.46
Optic deccentration	30	2
Malposition of loop	28	1.84
Win lshield wiper syndrome	-	-
Sun rise syndrome	5	0.36
Sun set syndrome	7	0.54
Lost lens syndrome	3	0.12
Late complications of PC IOL		
Pseudophakic bullous keratopathy	4	0.26
UGH syndrome	9	0.60

Complications of intraocular lens implantation

Figure 1: Decentration of intraocular lens papillary catch at 9o clock position

Figure 2:Pupillary capture of intraocular lens

Figure 3: Stirate keratopathy with corneal odema

Figure 4: Iritis with Hyphaema

Figure 5: Late iris prolapsed

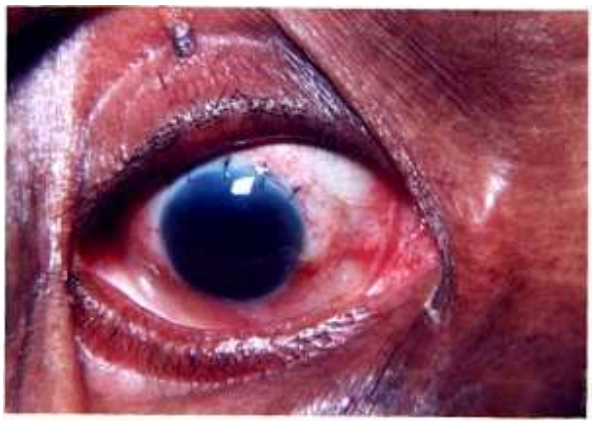

Figure 6: Pupil distortion

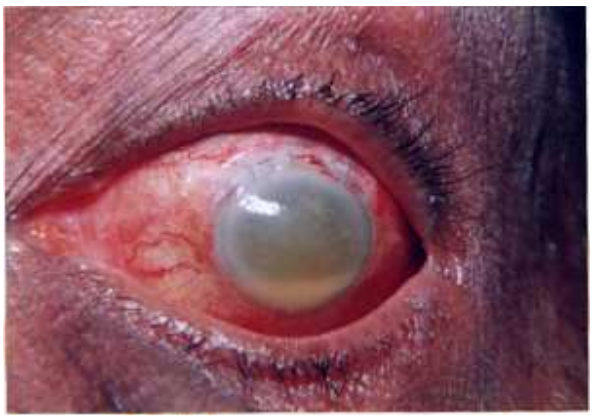

Figure 6: Pseudophakic Endophtalmitis

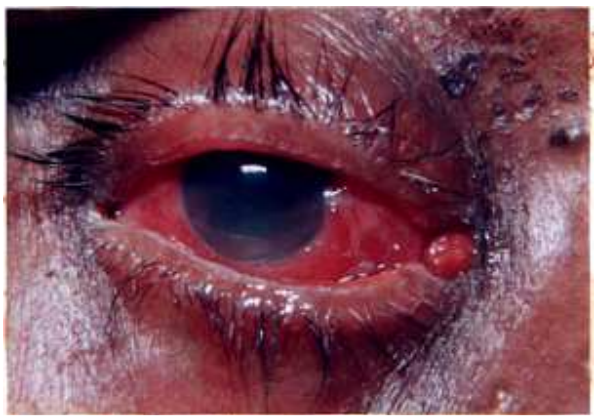

Figure7: UGH syndrome

Table 7: Post operative visual acuity

Visual acuity	Number	Percentage (%)
6/6	203	13.53
6/9	505	33.66
6/12	415	27.66
6/18	180	12
6/24	110	7.3
6/36	91	6
6/60	15	1
CF	11	0.73
HM	9	0.6
PL	6	0.4
No PL	5	0.33

33.6 % of post operative patients have visual acuity of 6/6

Discussion

Cataract is the main cause for visual impairment and blindness in India, accounting for 55%. According to the WHO cataract is common in the age group of more than 40 years because of the development of senile nuclear sclerosis and cortical opacification[13]Male preponderance is seen in the incidence of cataract. In

our country where main population is rural and main occupation being agriculture men are more prone for exposure to ultraviolet radiation. In our study the incidence of cataract was 73.2% over the age of 40 years and males were predominant 64% than females (36%).Among the type of cataract incidence of senile mature cataract is the commonest in our country. In our study 70% of cases were senile mature cataracts, while presenile mature cataracts accounted for 5% of cases were senile mature cataracts, while presenile mature cataracts accounted for 5% of cases. Incidence of Hyper mature cataract was 1.66% and nuclear cataract 23.33%.In this part of the country patients mainly constituted of rural population. Patients ignorance and economic status does not allow them to meet ophthalmologist at the earliest. Hence all the patients in our study were legally blind (V/A of less than 3/60) when they underwent pre-operative evaluation. The intact posterior capsule is the most important necessity for posterior chamber IOL implantation although PC I.O.L. implantation is done in some cases of posterior capsule rupture where there is no or minimum vitreous loss. Various studies have been carried out by different surgeons and different institutes in India and abroad. The incidence varies from different surgeons. According to a study conducted by Natchiar and Krishnadas study 14 on posterior capsule tear during PC I.O.L. implantation, 15 eyes (1.7%) developed P.C. tear out of 898 eyes. Out of 898 eyes. Out of 15 cases 7 case had vitreous loss. Krieglstain15 in 1980 reported an incidence of 4.3%. In 1990 Osher R.H. and Cionni R.J. 16 reported an incidence of 4.3%. The incidence of vitreous loss is 1.4% as reported by Kratz[17] in 1979. All cases of P.C. tear need not have vitreous loss as reported by Aravind Eye hospital where the incidence was 46.6% in presence of P.C. tear. Pearce reported 6.8% of P.C. tear of 444 cases in 1993.In our study majority of surgeries were done under operating microscope with good coaxial illumination (85.33%) and only 14.6% of cases underwent surgery using binocular loupe. In our study 4.13% eyes had P.C. tear. In most of the cases tear occurred during nucleus removal and cortical matter aspiration. The incidence of vitreous loss was 2.00% of which 2.66% in cases under binocular loupe and 1.33% in cases with operating microscope which is comparable to national standards (1% or even less in experienced surgeons hands). The incidence of hyphema was 1.13% and iridodialyis was 0.8% and these two complications did not affect the final visual outcome. In one patient hyphema cleared in the intermediate post operative period but he developed papillary capture on the temporal side. The capsulotomy was done with irrigating capsulotome with 26 G disposable needle in all the cases, and the type of capsulotomy was can opener technique. The irrigation solution used was either normal saline or Ringer lactate. The variation in corneal clarity after surgery due to the irrigation solution used, in our study was similar to the study conducted earlier [18](Dr. Samad 1995). In all the cases irrigation and aspiration was done with simcoie's bulb and cannula. In all the cases vascoelastic material (oculose) was used during surgery. In selective cases peripheral iredectomy was done,. Suture materials used were 8/0 silk, polymide 10/0 silk, monofilament nylon and polymide. Post operatively incidence of striate keratitis was quite high in our study (51.33%). This was inspite of using oculose in all the cases. The reason could be due to excessive manipulations during surgery like prolonged cortical wash up and faulty insertion of IOL. In a previous study conducted here (Dr. Samad 95) it was found that 77.42% had good corneal clarity when the time taken for A/C wash was less than 15 minutes, while corneal clarity was good only in 12.2% cases when the time taken was more than 15 minutes. In our study 25% cases had post operative iritis. It may be considered normal accompaniment in the 1st post operative week. It is mainly due to the surgical trauma as during manipulation of the iris, prolonged cortical wash, and implantation of IOL. Retained lens matter was also associated with iritis. Most of the iritis cases resolved when treated with steroids and cycloplegics. Retained lens matter which included anterior capsule tag and cortical matter was seen in 32% of cases. The incidence is quite high and is mainly due to inadequate cortical clean up, especially when good magnification was not used. In case where there was vitreous bulge during surgery maintaining intact posterior capsule was important for PC IOL implantation. So the fear of P.C. rupture could be one of the reasons for inadequate cortical wash. The incidence of papillary distortion in literature varies from 33% to 100% (Thorton.S.P. *et al* 1982)[19]. In our study papillary distortion was seen in 22% cases. Pupillary distortion could be due to iris sphincter damage, vitreous in the wound or when there is iris tuck by the IOL haptics which is improperly placed. In our study pupillary distortion did not have much role in the final visual outcome of the patient. Condon. *et.al*[20] noted that no cases of papillary block occurred with 1800 PC lenses. This was supported by Krat *et al*17 after studying 1000 P.C. IOL cases. In our study there was no incidence of papillary block. Secondary glaucoma in the 1st post operative week was 0.53%. The reason could be due to iridectomy done in selective patients. There is a recent trend towards eliminating the peripheral iridectomy for IOLs. In cases in 'In the bag' PC IOL implantation,

iridecotmy may be eliminated. However there was 0.6% incidence of uveitis, glaucoma and hyphema (UGH syndrome) during our study. The incidence of post operative endophthalmitis varies from surgeons and authors. The overall incidence of pseudophakic bacterial endophthalmitis has been reported as between 0.056% and 5.7% of cases. However considering the increasing use of intraocular solutions such as viscoelastic agents and irrigating solutions the possibility exists that substances designed for use in the eye will be contaminated[21]. The incidence of post operative endophthalmitis was 0.26% (one case), This patient was treated with higher antibiotics and steroids vigourously, Patient refused to undergo second surgery and eye became phthisical. IOL displacement in the 1st post operative week occurred in 9 patients (0.6%) and AC lens was introduced from them in the second post operative week[22]. In the intermediate post operative period the incidence of lens dislocation was 1.60% in the present study. The lens dislocation was seen inferiorly in most of cases. In some cases the haptic and edge of optic was in the pupilary area and in other cases superior haptic was in the AC with updrawn pupil. Decentering of lens occurred in 2% of case during intermediate (upto 6 weeks) post operative period which was probably due to the haptic being stuck in the sulcus. Incidence of pupil capture was 2.46%. Pallin[23] noted 1.3% incidence in 150 cases of uniplanar posterior chamber IOL's that were sulcus fixated while there was no occurrence in 61 cases using similar lenses that were bag fixated. Landstorm and Herman [24] reported a 3% incidence in a study of 100 cases. In our study all the cases were "in-th-bag" or sulcus fixated and the pupils dilated to treat iritis in some cases. This could have encouraged pupil capture in these cases. Incidence of After cataract varies widely, the incidence being upto 50% after 3 to 5 years follow up (Sinsky R.M. and Cain Jr. W.)25 and in children nearly 100% develop posterior capsular opacification 2.3 years after surgery. The incidence increases with period of study. In the present study in incidence of posterior capsule opacification increased at the end of one year (13.66%). The incidence was more when binocular loop was used (45.4%) as compared to 17.8% who underwent surgery using operating microscope. The incidence of opacification may be reduced by thorough cortical clean up and posterior capsule polishing and usage of reverse optic lenses.4% of patients underwent discussion for after cataract during 6 months. The incidence of cystoids macular oedema varies greatly in different studies. Jaffe 1982 reported an incidence of 1.4% in I.C.C.E. patients followed over 6 months. Kratz et. Al 17reported an incidence of 0.75 in ECCE cases followed over 6 months. In our study the incidence of macular oedema was 0.4%.According to F.D.A.26 study the incidence of retinal detachment is 0.6% During our study we got 0.4% cases as having retinal detachment in posterior chamber psuedophakos. There was an incidence of 0.26% pseudophakic bullous keratopathy. Generally post operative astigmatism after cataract extraction is of 'against the rule' type when 8/0 virgin silk suture is used and 'with the rule' type when 10/0 monofilament nylon suture is used. In the present study 80.13% cases 'with the rule astigmatism', with 8/0 silk, while 14.1% against the rule and 5.77% oblique astigmatism. Using 10/0 monofilament nylon 92.86% of cases had 'with the rule astigmatism' and 7.14% oblique astigmatism. The incidence of astigmatism was more when magnification used was binocular loupe as compared to operating microscope.The final visual acuity of 6/12 or better was achieved in 74% of cases. 13.3% had impaired vision (V/A less than 6/12) due to after cataract high astigmatism, Macular oedema, chronic uveitis, lens displacement, and optic atrophy accounted for impaired vision in other patients.

Conclusion

Incidence of Cataract was more in the age group of 40-60 years 49.6% and males were predominant (64%). Senile mature cataract was the main indication for P.C. Visual acuity in these patients was poor with counting fingers in 76% . A planned extra capsular cataract extraction with P.C. IOL implantation was done. In 4.13 % cases had Posterior chamber rupture so in these cases anterior chamber IOL was placed. Most common intermediate post operative complication is straite keratitis of 51.33% and late post operative complication after cataract pseudoplakic bullous of 13.66% is observed. After follow up of 6 months 33.6 % of post operative patients have best corrected visual acuity of 6/6 which is showing good improvement in vision. Finally the complications of PC IOL implantation can be minimized by better microsurgical techniques, magnification and the experience of operating surgeon.

References

1. Albert and Jackobic : "Principles and practice of ophthalmology" Vol. 1.
2. Frick K, Foster A. The magnitude and cost of global blindness: A problem that can be alleviated. Am J of Ophthalmol. 2003; 135(4):471-476.

3. Clayman H.M. Jaffe N.S., Galin M.A.: "Intraocular lens Implantation: Techniques and complications". St. Louis, CV Mosby Co.1983, 244-251.
4. Wiechens B, Winter M, Haigis W, Happe W, Behrendt S, Rochels R. Bilateral cataract after phakic posterior chamber top hat-style silicone intraocular lens. J Refract Surg. 1997 Jul-Aug;13(4):392–397.
5. Brauweiler PH, Wehler T, Busin M. High incidence of cataract formation after implantation of a silicone posterior chamber lens in phakic, highly myopic eyes. Ophthalmology. 1999 Sep;106(9):1651–1655
6. Ocular Surgery News, 2 pages, Feb. 1998, "Acrylic IOL performs well in 7,000 cases by a single surgeon.
7. Ocular Surgery News, 4 pages, Dec. 1999, "More evidence suggests IOL optic material and design can affect PCO.
8. Keener GT. The nucleus division technique for small incision cataract extraction. In: Rozakis GW, Anis AY, *et al*., editors. Cataract Surgery: Alternative Small Incision Techniques. Thorofare (N.J): Slack Inc; 1990.163–195.
9. Fry LL. The Phacosandwich Technique. In: Rozakis GW, Anis AY, *et al*., editors. Cataract Surgery: Alternative Small Incision Techniques. Thorofare (N.J): Slack Inc; 1990.71–110.
10. Kansas P. Phacofracture. In: Rozakis GW, Anis AY, *et al*., editors. Cataract Surgery: Alternative Small Incision Techniques. Thorofare (N.J): Slack Inc; 1990. 45–70.
11. Norman. S. Jaffe: "Cateract surgery and its complications", 5th Edn. 1990.
12. Kratz R.P. "Complications associated with posterior chamber Lenses". Ophthalmology, 1979;86:659-661.
13. National Programme for Prevention of Visual Impairment and Control of Blindness in India, New Delhi: Ministry of Health and Family Welfare, 1978.
14. Natchair. *et al*: Posterior capsule tears during extracapsular cataract surgery in India. Aravind Eye Hospital, Madurai, India.: Archives of Ophthalmology . 1993; 111(5):706-8.
15. Krieglstein GK, Duzanec Z, Leydhecker W. Cataract surgery: types and frequencies of complications. Albrecht Von Graefes Arch Klin ExpOphthalmol 1980; 214: 9-13
16. Osher R.H., Cionni R.J. The torn posterior capsule: its intraoperative behavior, surgical management, and long-term consequences. J Cataract Refract Surg. 1990;16(4):490–494.
17. Kratz R.P. "Complications associated with posterior chamber Lenses". Ophthalmology, 1979;86:659-661
18. Samad A, Solomon LD, Miller MA*:* Anterior chamber contamination after uncomplicated phacoemulsification and intraocular lens implantation. Am J Ophthalmol1995:120:143–150.
19. Thornton SP et.al: Thornton guide for radial keratotomy incisions and the optical zone size. J Refract Corneal Surg:1985: 1: 29–33.
20. Condon GP: Simplified small-incision peripheral iris fixation of an AcrySof intraocular lens in the absence of capsule support. J Cataract Refract Surg 29:1663, 2003
21. RevRev-Med-Panama: "Ugh syndrome by hard lenses in P.C. "1991: 16(3): 155-60.
22. Heilskov T, Joondeph BC, Olsen KR, Blankenship GW: Late endophthalmitis after transscleral fixation of a posterior chamber intraocular lens. Arch Ophthalmol 1989:107:1427.
23. Pallin P: "Clinial factors relating to cystoids macular edema after lense implantation". Am Intraocular Implant Soc J, 1981 Jan:7.
24. Lindstorm R.I. Herman W.K.: "Pupil Capture: Prevention and management". Am Intraocular implant t Soc J. 1983: 9:201-204
25. Sinsky RM and Cain W Jr: The posterior capsule and phacoemulsification.Am Intraocul Implant Soc J 1975, **4**: 206–7.
26. Sanders DR, Brown DC, Martin RG, Shepherd J, Deitz MR, DeLuca M. Implantable contact lens for moderate to high myopia: phase 1 FDA clinical study with 6 month follow-up. J Cataract Refract Surg. 1998 ;24(5):607–611.

Source of Support: Nil
Conflict of Interest: None